

(12) UK Patent Application (19) GB (11) 2 067 291 A

(21) Application No 8041220
(22) Date of filing 23 Dec 1980
(30) Priority data
(31) 8000413
(32) 9 Jan 1980
(33) France (FR)
(43) Application published
22 Jul 1981
(51) INT CL³
G07C 5/06 G01D 15/00
(52) Domestic classification
G1J 2C1A 2D5A
(56) Documents cited
GB 1397353
GB 1233319
GB 973459
GB 949917
GB 898957
GB 343912

(58) Field of search
G1J
G1K

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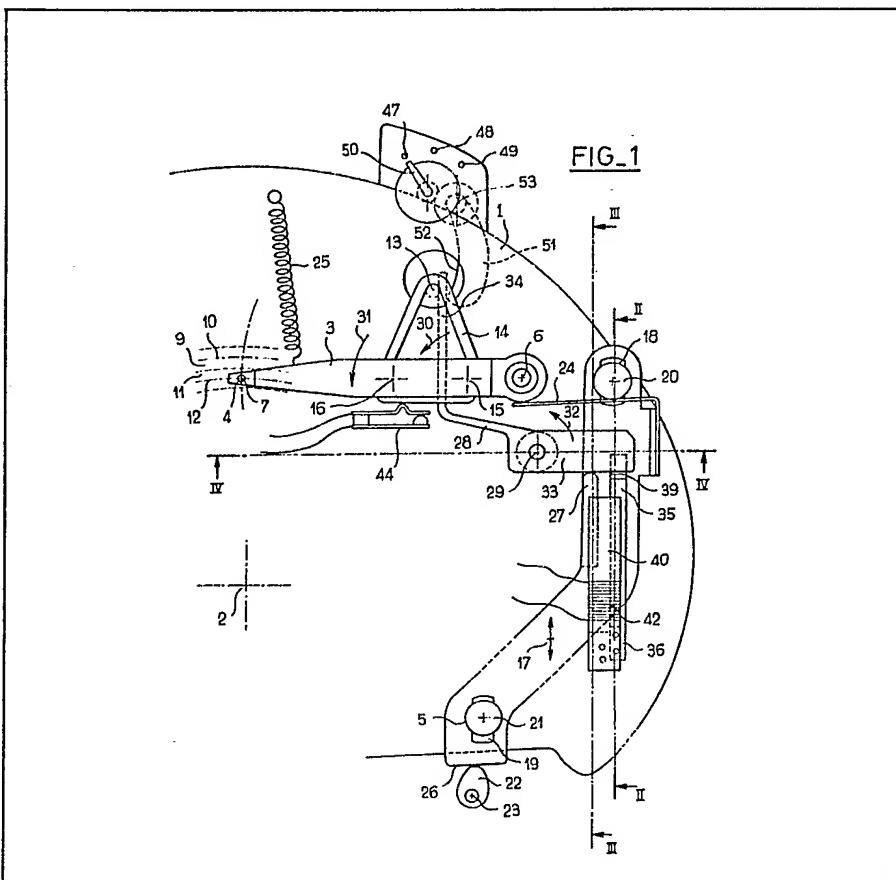
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(54) Device for controlling the positioning of the pen of a tachograph

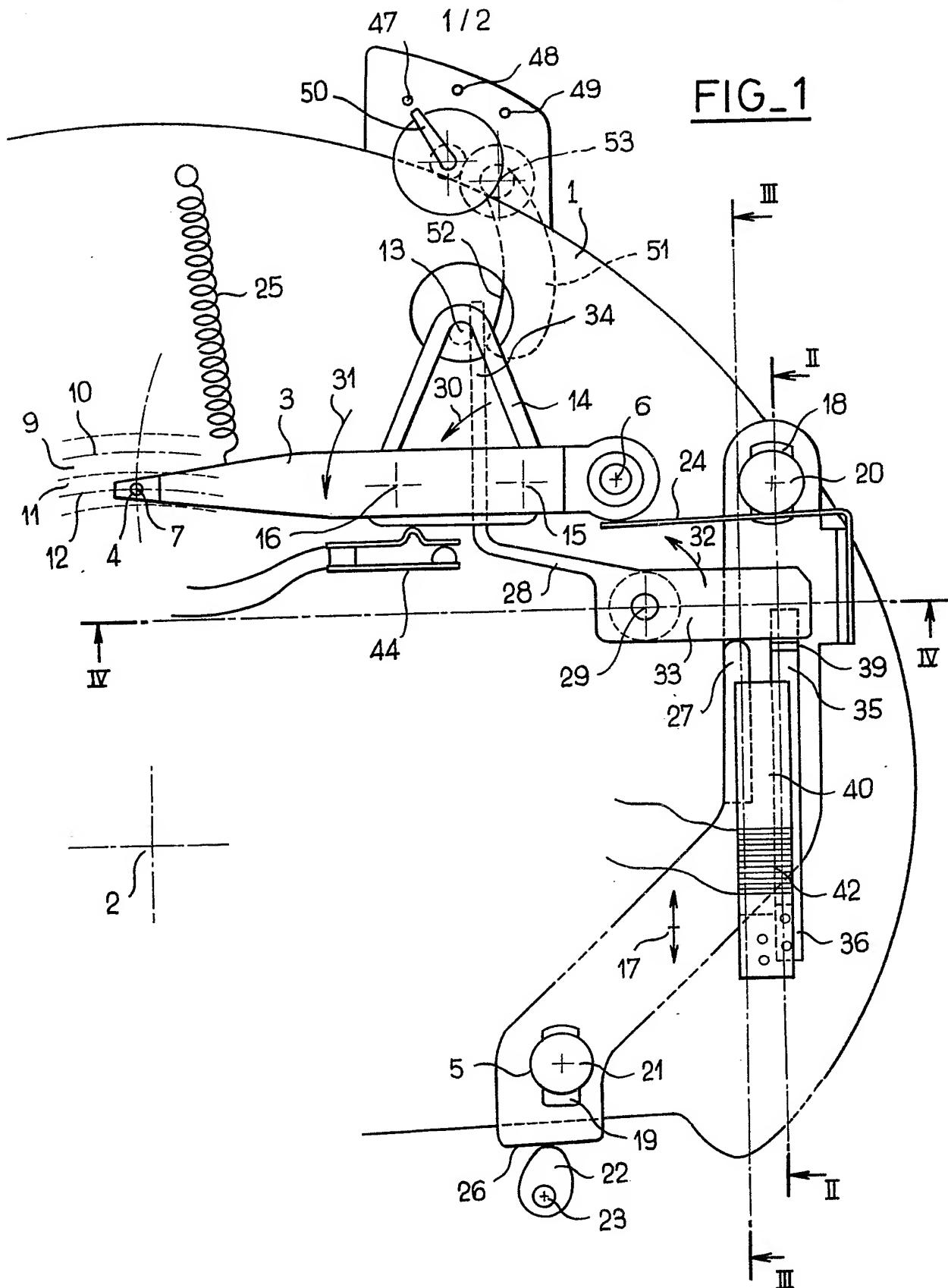
(57) A tachograph is provided in which 12 indicates a trace of pen 7 on track 11 corresponding to the "driving" position and 10 indicates a trace on track 9 corresponding to one of a plurality of "stationary" positions selected by switch 50, the pen 7 being automatically movable between the "driving" position and the "stationary" position. The pen 7 is supported by a pivoting lever 3 urged by spring 25 towards the "stationary" position. An indicator member 5, to which is

imparted an alternating movement 17 when the vehicle is moving, has a resilient member 24 secured to it, which oscillates lever 3 about axis 16, and is provided with a push rod 27 tending alternately to push the lever 3 and pen 7 into the "driving" position and allow them to return to the "stationary" position. However, when the vehicle is moving, a retractable stop 39 opposes this return. An electrical control device sensing stoppage of the vehicle operates automatically to retract the stop 39 and push-rod 27 after a time delay to allow the pen to move to the "stationary" position.

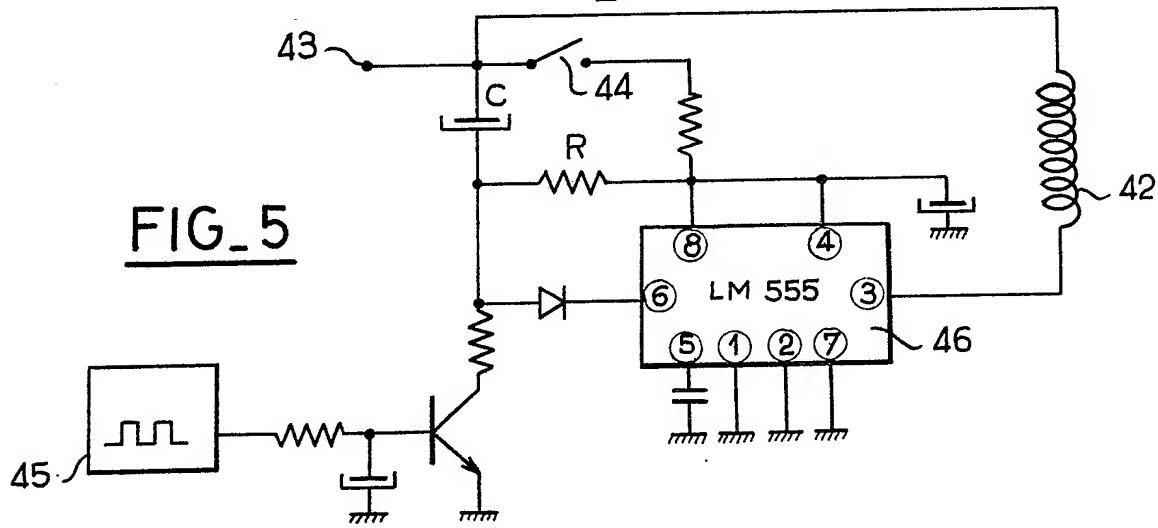
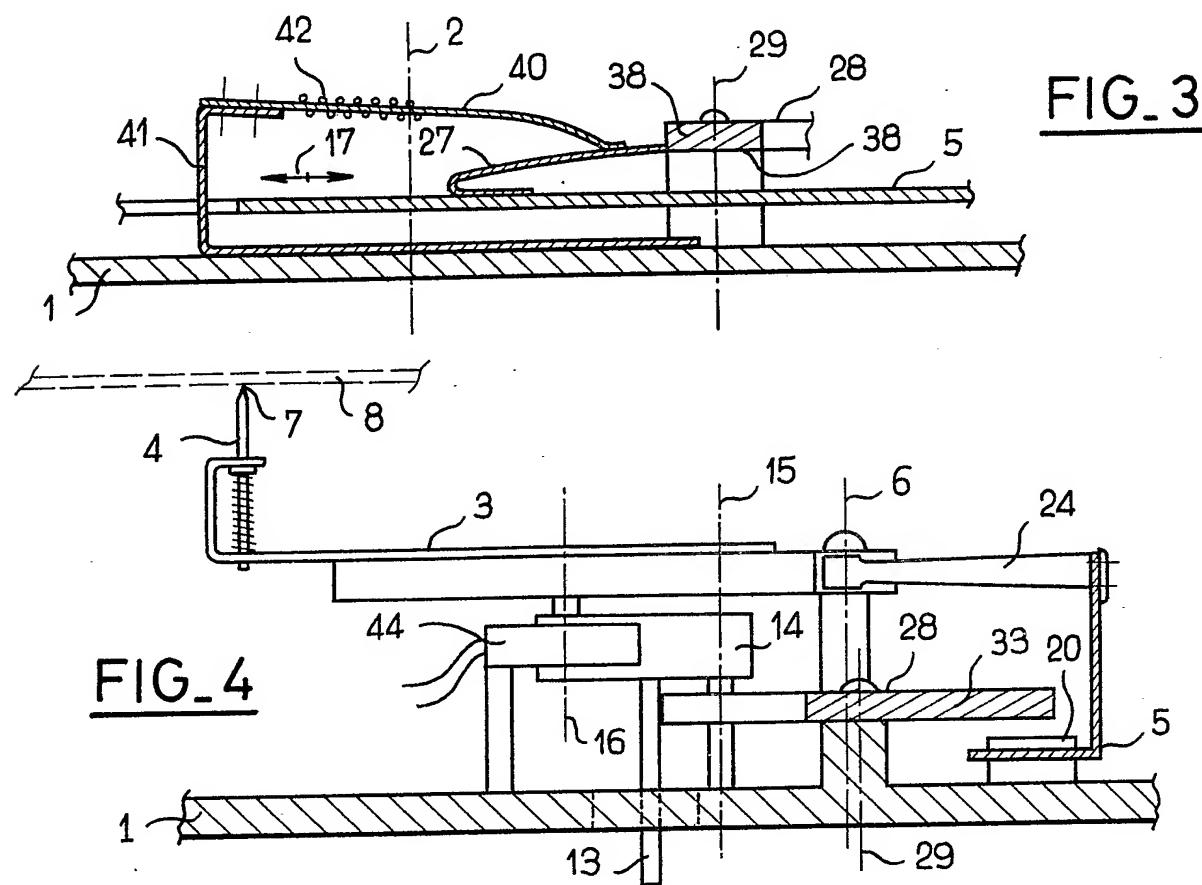
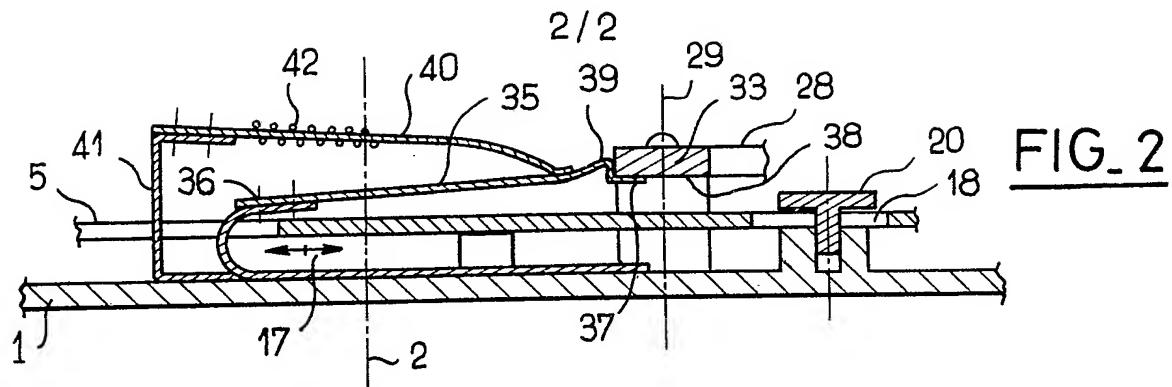


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FIG_1



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SPECIFICATION**Device for controlling the positioning of the pen of a tachograph**

The present invention relates to a device for controlling the positioning of the pen of a tachograph and in particular of the so called "driver" pen.

It is known that tachographs fitted to commercial vehicles for recording a certain amount of information in particular comprise a "driver" pen able to move between several positions, more precisely between a so called "driving position" in which it draws a graph indicating the travel of the vehicle, i.e. that it is moving and generally several "stationary positions" in which it draws graphs indicating the stoppage of the vehicle for various reasons respectively. For example, there are three of these "stationary positions", namely one position where the pen records temporary interruptions in the travel of the vehicle, for example for the purpose of making deliveries and two positions respectively provided for recording stoppage times for maintenance or repair of the vehicle and stoppage times to enable the driver to rest.

A switch located on the tachograph box enables the driver to position the pen manually according to which of these situations he is in at the time.

Now, if this solution is satisfactory for positioning of the pen for the purpose of recording a frequently prolonged period of stoppage corresponding to the driver's rest period or to immobilization of the vehicle for maintenance or repairs, it may be found that frequently the driver forgets to effect the switch between driving and stationary positions, in particular when a short period of travel is interspersed with frequent stops, for example in the case of delivery vehicles.

This results in incorrect graphs which cannot be used.

The object of the present invention is to remedy this drawback and to this end to propose a device automatically bringing about the passage and retention of the "driver" pen in the driving position or in a stationary position determined manually by means of the switch.

Due to this automatic passage and retention of the pen in either position, the driver is relieved of the task and any danger of him forgetting is eliminated, which makes it possible to obtain graphs which are truly representative of the movements of the vehicle.

To this end, there is provided according to the invention a device for controlling the position of the pen of a tachograph, for causing the passage into and the retention of the pen in a predetermined position, the so called "driving position" when the vehicle is moving and in another predetermined position the so called "stationary position" when the vehicle is stopped, the pen being supported by a lever which is mounted to pivot on a support, about a transverse axis, between a driving position and a stationary

65 position and comprising spring-loaded means for return from the driving position to the stationary position, characterised in that it comprises:

- an indicator member and means for imparting to this member, with respect to the support, a movement having an alternating component in a plane at right angles to the axis, when the vehicle is moving and for immobilizing it — when the vehicle is stopped,
- a push-rod supported by the indicator member, in operational connection with the lever, for alternately pushing the lever towards the driving position and allowing it to return freely to the stationary position under the action of the spring-loaded return means,
- 70 80 — a retractable stop carried by the support, in operational connection with the lever, allowing a free movement of the latter towards the driving position and opposing its return to the stationary position,
- 85 90 — means for automatically retracting the stop when the vehicle is stationary and thus allowing the return of the lever to the stationary position under the action of the spring-loaded return means.
- 90 The invention will now be further described by way of example with reference to the accompanying drawings in which:—
- Fig. 1 is a front view of an automatic control device according to the invention, fitted on a commercial tachograph, in the driving position;
- 95 Figs. 2 to 4 are sectional views respectively on planes II—II, III—III, IV—IV in Fig. 1; and
- Fig. 5 shows an electrical wiring diagram of a delay member for the automatic return of the pen to the stationary position in the device in Fig. 1.
- 100 In these figures, the reference numeral 1 designates a support plate which is stationary with respect to the tachograph body (not shown) and which is in the form of part of a disc arranged transversely with respect to a fixed axis 2 of this body.
- 105 In a manner which is known from the technology of tachographs, the plate 1 supports a pivoting lever 3 supporting a pen known as the "driver pen" 4 and a sliding rod 5 constituting a member for indicating the movement of the vehicle.
- 110 115 In known manner, one end of the lever 3, which is substantially parallel to the plate 1, is mounted to pivot on the latter about an axis 6 parallel to the axis 2, with the possibility of slight movement in all radial directions with respect to this axis 6. At its other end, the lever 3 supports the pen 4, arranged substantially at right angles to the plate
- 120 125 1 and at its end furthest from the latter comprising a point 7 coming into contact, when the tachograph is in use, with a waxed paper disc 8 on the axis 2, set in rotation about this axis by means which are not shown and known per se, when the tachograph is in operation. During this rotation, depending on the angular position of the lever 3 about the axis 6, which is itself dependent on whether the vehicle is moving, has stopped temporarily, or for repairs or for the driver's rest

period, the point 7 of the pen 4 moves against the disc 8 on one or other of the annular tracks of this disc in order to draw on the latter, as it rotates uniformly with respect to time, a graph

5 representing the successive instantaneous states of the vehicle.

In figure 1, a part of two of these tracks is shown in broken line, namely a track 9 on which the point 7 of the pen 4 draws a graph along a 10 circular curve 10 centred on the axis 2, when the lever 3 occupies a position about the axis 6 corresponding to the stoppage of the vehicle and a track 11, directly adjacent and closer to the axis 2, on which the point 7 of the pen 4 draws a graph 15 along a circle 12 also centred on the axis 2, when the lever 3 occupies its position about the axis 6 corresponding to movement of the vehicle (position illustrated in figures 1 to 4) or the "driving" position. For example the track 9 20 corresponds to temporary stoppage of the vehicle, two annular tracks (not shown) directly adjacent the track 9 and further from the axis 2 respectively being intended for recording by means of the pen 4, periods of stoppage for repairs or maintenance 25 and for the driver's rest period.

On a tachograph of traditional type, the angular position of the pen 4 about the axis 6, i.e. the choice of the track on which the point 7 of the pen 4 draws a graph on the disc 8, is selected by 30 manual action on a switch acting on a pin 13, substantially perpendicular to the plate, of an intermediate part 14 mounted to pivot at one end on the plate 1 about an axis 15 parallel to the axis 6 and at the other end on the lever 3, 35 approximately mid-way between the two ends of the latter, about an axis 16 also parallel to the axis 6, the axis 15 being located approximately between the axes 16 and 6. The mounting of the lever 3 with radial clearance about the axis 6 40 allows the operation of such a mounting.

The manual switch acts for example by rotation on a cam, whereof the periphery, which is eccentric with respect to the axis of rotation, is in contact with the pin 13 in order to act on the latter 45 by pushing it in the direction of a passage of the pen towards the driving position, against the action of a return spring 25, which will be described hereafter, maintaining this contact by tending to return the pen towards the stationary 50 positions, in a resilient manner.

In the case of a tachograph equipped according to the invention, the manual switching is preserved for example in the above form for the positions of the pen corresponding to stoppage of 55 the vehicle, i.e. respectively to temporary stoppage, to stoppage for maintenance and to stoppage for the driver's rest period. Each of these positions marked respectively at 47, 48, 49 of the manual switch 50 nevertheless in fact allows 60 positioning of the pen on the one hand in the stoppage position preselected in this way and on the other hand in its "driving" position, the passage of the pen from one to the other of these two positions taking place automatically under the 65 influence of a member indicating the possible

travel of the vehicle. It will be assumed hereafter that the switch 50 has been placed manually in its position 47 allowing access on the one hand to the position of the pen corresponding to

70 temporary stoppage and on the other hand to the position corresponding to travel of the vehicle, as a non-limiting example.

This position of the switch 50 is illustrated in figure 1, in which the lever 3 and the pen 4 have

75 on the other hand been shown in the "driving" position. The reference numeral 51 designates the cam controlled by the switch, 52 the periphery of the latter in contact with the pin 13 when the vehicle is stationary, which defines the

80 corresponding positions of the pen 4 depending on the position of the switch 50, the pin 13 moving away from this periphery 52 in the "driving" position and 53 designates the axis of rotation of the cam 51.

85 The member indicating the possible movement of the vehicle is in this case constituted by the rod 5, which exists on tachographs of known type, but other indicator members, pre-existing or otherwise, could naturally be used for this purpose 90 without diverging from the scope of the invention.

The rod 5, in known manner, is substantially parallel to the plate 1 and mounted to slide on the latter in a direction shown by a double arrow 17 in the drawings. For this purpose, the rod 5

95 comprises apertures 18 and 19 for example, parallel to the direction 17, in which are respectively engaged members 20 and 21 for retention against the plate 1.

100 The direction 17, which is fixed with respect to the plate 1, is approximately perpendicular to the plane defined by the axes 6 and 15. When the vehicle is moving, a reciprocating movement in the direction 17 is imparted to the rod 5 by a cam 22 mounted to rotate about an axis 23

105 perpendicular to the direction 17 and set in rotation about this axis in synchronism with the possible rotation of the output shaft of the vehicle gearbox (this output shaft and the means for connection to the cam 22 are known and have not been shown).

110 It will be noted that the cam 22 exists on numerous tachographs presently on sale commercially, in the same way as the rod 5, but it would not be outside the scope of the invention to use other means for controlling the alternating reciprocating movement of the member indicating travel in direction 17.

115 During the reciprocating movement of the rod 5 in direction 17, a resilient pin 24 of the rod acts on the end of the lever 3 corresponding to the axis 6 for bringing about a reciprocating movement of the lever 3 in rotation about the axis 16, the intermediate part 14 thus being fixed in the driving position. In the vicinity of the point 7 of the pen 4, this movement has an amplitude less than the width of one track on the disc 8 and results in a thickening of the line on the disc. This amplitude is linked with that of the play, with respect to the axis 6, of the corresponding end of the lever.

120 125 130 To do this, a spiral spring 25 which is in

tension, connects a point of the lever 3 located between the axis 16 and the pen 4 to a point located beyond the lever with respect to the axis 2 in order to tend to move the pen away with respect to this axis and the resilient pin 24 is in contact with the end of the lever 3 corresponding to the axis 6 such that, in one of its extreme positions corresponding to the reciprocating movement of the rod 5 in direction 17, it completely releases this end and thus allows the pen 4 to move away with respect to the axis 2, under the action of the spring 25, within the limits allowed by the possible play of the lever about the axis 6 and, in the other extreme position, imparts a pushing action to the end of the lever 3 corresponding to the axis 6, against the action of the spring 25, in order to move the pen 4 towards the axis 2 within the limits allowed by the possible play about the axis 6. Nevertheless, in the first said extreme position, the pin 24 remains in contact with the lever 3, in order to maintain against the periphery of the cam 22 the counterpart 26 of the latter on the rod 5, thus cooperating with the spring 25.

25 Thus, if we refer to the relative positions illustrated in figure 1 as a non-limiting example, where the lever 3 is located approximately horizontally in the upper part of the plate 1 and where the direction 17 is approximately vertical, the rod 5 having an upper end approximately in the vicinity of the extension of the lever 3 beyond the axis 6 and a lower end in contact on its underside with the periphery of the cam 22, the spring 25 is located above the lever 3 and the resilient pin 24 below this lever, but other arrangements could naturally be chosen without diverging from the scope of the invention.

According to the present invention, apart from the resilient pin 24 existing on commercial tachographs, the rod 5 comprises a resilient pin 27 fulfilling the function of a push rod acting, through the intermediary of a lever 28, on the pin 13 in order to bring about automatic passage of the lever 3 from the preselected stationary position to the driving position, when the vehicle restarts after a stoppage and in order to allow the lever to return to the selected stationary position when driving stops, in practice under the action of the spring 25 as will become apparent hereafter.

50 The intermediate lever 28, arranged parallel to the plate 1 and mounted to rotate on the latter, about an axis 29 parallel to the axis 2, is in the shape of an L, whereof one side comes into contact with the pin 13 in the direction of rotation 30 of the latter about the axis 15 corresponding to a rotation of the axis 16 or more generally of the lever 3, about the axis 6, in the direction 31 of passage from a stationary position to the driving position and whereof the other side is located, with respect to the pin 27, in order to receive the latter, when the rod 5 carries out a reciprocating movement in direction 17, a pushing movement in a direction corresponding to the direction of rotation 32 of the lever 28 about its axis 29 in turn corresponding to a pushing action imparted by the

lever 28 to the pin 13 in the direction 30. The directions 30, 31, 32 correspond in the example illustrated to a rotation in the trigonometric direction about the corresponding axes. In this example, the lever 28 comprises an approximately horizontal side 33 in contact on its underside with the pin 27 and pivoted on the plate 1 about the axis 29 between the point of contact with the pin 27 and the second side of the L 34, which extends approximately vertically upwards and is in contact, by its upper end, with the pin 13 located on the same side as the spring 25 with respect to the lever 3.

In the case of the example illustrated, an ascending movement of the rod 5 in direction 17 is accompanied by the abutment of the pin 27 below the side 33 of the lever 28, which rotates in direction 32 about the axis 29 and by its side 34 pushes the pin 13 in direction 30, resulting in the rotation of the lever 3 in direction 31 about the axis 6, which after a stoppage, moves the point 7 of the pen 4 from track 9 to track 11 of the disc 8. During this movement, a retractable stop 35 carried by the plate 1 and designed in order that this passage takes place freely, is located in order to oppose a return movement of the lever 3 to the stationary position, if the vehicle continues to move. The stop 35 is in this case constituted by a spring strip fixed by one of its ends 36 to the plate 95 1 and interposed at its second end 37 between the plate 1 and the side 33 of the lever 28, in sliding contact with the face 38 of this side 33, which faces the plate. On its face in contact with the face 38, the strip 35 comprises a ridge 39 sloping gently towards the end 36, but abruptly towards the end 37 such that, when the pin 27 pushes the side 33 in the direction 32, the face 38 is able to slide on the area of the strip 35 closest to the end 37 and that, when the lever 28 occupies a position in which the lever 3 is in the driving position, the ridge 39 will engage the edge of the side 33 on which the pin 27 is pushing, in order to prevent a return of the lever 28, of the part 14 and of the lever 3 in the opposite direction, when the pin 27 draws back owing to the alternating movement of the rod 5. This engaged position is illustrated in particular in figures 1 and 2.

The return of the lever 3 to the stationary position selected takes place automatically after a certain stoppage time, due to the set of means retracting the ridge 39 of the strip 35 and the pin 27, which releases the lever 28, the part 14 and the lever 3 and allows the spring 25 to carry out its return function.

In the example illustrated, the retraction means having a time lag comprise a bimetallic strip 40 in contact by one of its ends with the face of the strip 35 furthest from the plate 1, in the vicinity of the ridge 39. Since the resilient pin 27 is also constituted by a spring strip, the bimetallic strip 40 is also in contact with the face of the strip 27 furthest from the plate 1, by its end in contact with the strip 35.

130 As for the other end of the bimetallic strip 40,

this is supported by a support 41 which is fixed with respect to the plate 1.

The bimetallic strip may be temperature-compensated.

5 Between its two ends, the bimetallic strip 40 is surrounded by a heating resistance 42 which, when supplied with electric current, causes the bimetallic strip 40 to bend inwards in the direction of the plate 1, i.e. causes pressure on the strips 27
 10 and 35 causing the retraction of the latter and in particular the retraction of the ridge 39 which allows the arrangement of the lever 28 — intermediate part 14 — lever 3 to return to the selected stationary position under the action of
 15 the return spring 25.

The delay means causing the supply of electric current to the heating resistance 42 after a predetermined stoppage time of the vehicle have been shown diagrammatically in figure 5, where
 20 the reference numeral 43 designates the output of the general contact switch of the vehicle, 44 designates an electrical contact located on the plate 1 in order to close when the lever 3 occupies the driving position and open at other times
 25 (example illustrated in figure 1; this contact is actuated by the intermediate part 14 but could also be actuated by the lever 3 itself, or by the lever 28, or by any other part occupying a position characteristic of the movement of the vehicle), 45
 30 designates a pulse transmitter located at the output of the gearbox or an electrical contact actuated by the rod 5 in order to emit square-wave signals when the vehicle moves, C designates a capacitor, R a resistance and 46
 35 designates an integrated circuit of the LM 555 type.

When the lever 3 occupies the driving position, a position in which it is retained by the action of the strip 35, the electrical contact 44 is closed and
 40 brings into action the time lag, whereof the time is adjusted by the capacitor C and the resistance R. As long as the vehicle is moving, the pulse transmitter 45 keeps the capacitor C charged at the supply voltage.

45 If, on the other hand, the vehicle stops, which results in an absence of pulses coming from the transmitter 45, the capacitor C discharges into the resistance R, up to the tripping threshold of the integrated circuit 46 which controls the supply of
 50 the heating resistance 42 i.e. the heating and deformation of the bimetallic strip 40 which pushes the strip 35 and the strip 27 towards the plate 1 and releases the arrangement of the lever 28 — part 14 — lever 3, which returns to the
 55 stationary position under the action of the return spring 25. At the same time, the contact 44 opens and the delay means are de-activated.

Naturally, one could choose other means for the immobilization and automatic release of the
 60 driver pen without diverging from the scope of the invention, in particular by acting more directly on this pen. However, it will be noted that, even in its method of implementation described and illustrated, which corresponds to the equipment of
 65 an existing tachograph, the invention is simple and

economical to implement, whilst providing advantageous automation, providing a graph which is truly representative of the division of time, in particular between driving periods and periods of temporary stoppage. As regards the latter, the choice of a suitable time lag for the return of the pen to the selected stationary position makes it possible to prevent inopportune return movement to this position when the vehicle
 70 is travelling at a very low speed or is required to stop for a short time, for example for reasons connected with the traffic.

CLAIMS

1. Device for controlling the positioning of the pen of a tachograph, for bringing about the passage into and retention of the pen in a predetermined position, the so called "driving position" when the vehicle is travelling and into another position, the so called "stationary position" when the vehicle is stopped, the pen being carried by a lever mounted to pivot on a support, about a transverse axis, between a driving position and a stationary position and comprising spring means for the return from the driving position to the stationary position, characterised in that it comprises:
 - an indicator member and means for imparting to this member, with respect to the support, a movement having an alternating component in a plane at right angles to the axis when the vehicle is travelling and for immobilizing the latter when the vehicle is stopped,
 - a push rod supported by the indicator member, in operational connection with the lever, for alternately pushing the latter into the driving position and allowing it to return freely to the stationary position under the action of the spring return means,
 - a retractable stop carried by the support, in operational connection with the lever, allowing the free movement of the latter into the driving position and preventing its return to the stationary position,
 - means for automatically retracting the stop when the vehicle is stationary and thus allowing the return of the lever to the stationary position under the action of the spring return means.
2. Device according to claim 1, characterised in that the stop tends to occupy its abutment position in a resilient manner and in that the means for retracting it comprise a bimetallic strip applying a retraction pressure to the stop when it is heated and releasing it when it is cold and means for causing the heating of the bimetallic strip when the vehicle is stopped.
3. Device according to one of the preceding claims, characterised in that the means for retracting the stop have a time lag.
4. Device according to claims 2 and 3, characterised in that the heating means have a time lag.
5. Device according to one of the preceding claims, the lever being pivoted about an axis parallel to said axis, on an intermediate member

itself pivoted on the support about an axis parallel to the two preceding axes, characterised in that the push rod and the retractable stop are in operational connection with said intermediate member.

6. Device according to claim 5, characterised in that the push rod and the retractable stop are in operational connection with said intermediate member by means of a second lever pivoted on the support about an axis parallel to the preceding axes and comprising an area able to come into contact with the push rod and with the stop and an area in contact with the intermediate member.

7. Device according to one of the preceding claims, characterised in that the indicator member is constituted by a rod mounted to slide on the support in the direction of the said component and in that the means for imparting the said movement to the rod comprise a rotary cam, rotated about itself in synchronism with the output

5 shaft of the vehicle gearbox, the rod being kept in contact with the periphery of this cam by spring return means.

8. Device according to one of the preceding 25 claims, characterised in that the push rod is a resilient pin of the indicator member.

9. Device according to one of the preceding claims, characterised in that it comprises means for automatically retracting the push rod, when 30 the vehicle is stationary.

10. Device according to claim 9, characterised in that said means for automatically retracting the push rod are similar to said means for automatically retracting the stop.

11. Device according to one of the preceding 35 claims, characterised in that it comprises means for preselecting several "stationary positions".

12. A tachograph substantially as hereinbefore described with reference to the accompanying 40 drawings.

PUB-NO: GB002067291A
DOCUMENT-IDENTIFIER: GB 2067291 A
TITLE: Device for controlling the positioning of the pen of a tachograph
PUBN-DATE: July 22, 1981

ASSIGNEE-INFORMATION:

NAME	COUNTRY
JAEGER	N/A

APPL-NO: GB08041220
APPL-DATE: December 23, 1980

PRIORITY-DATA: FR08000413A (January 9, 1980)

INT-CL (IPC): G07C005/06 , G01D015/00

EUR-CL (EPC): G07C005/06

US-CL-CURRENT: 346/62 , 346/139R

ABSTRACT:

CHG DATE=19990617 STATUS=O> A tachograph is provided in which 12 indicates a trace of pen 7 on track 11 corresponding to the "driving" position and 10 indicates a trace on track 9 corresponding to one of a plurality of "stationary" positions selected by switch 50, the pen 7 being automatically movable between the "driving" position and the "stationary" position. The pen 7 is supported by a pivoting lever 3 urged by spring 25 towards the "stationary" position. An indicator member 5, to which is imparted an alternating movement 17 when the vehicle is moving, has a resilient member 24 secured to it, which oscillates lever 3 about axis 16, and is provided with a push rod 27 tending alternately to push the lever 3 and pen 7 into the "driving" position and allow them to return to the "stationary" position. However, when the vehicle is moving, a

retractable stop 39 opposes this return. An electrical control device sensing stoppage of the vehicle operates automatically to retract the stop 39 and push-rod 27 after a time delay to allow the pen to move to the "stationary" position. 